UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
ALHIJA, SAIF A

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>1</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2007*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 17-26* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 17-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-12 and 17-26* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-12, 17-26 have been presented for examination.

        Claims 21-26 have been newly presented.

        Claims 13-16 have been cancelled.

Election/Restrictions

2.   Following Applicants response with the inclusion of claims 21-26 restriction to one of the following

inventions is required under 35 U.S.C. 121:

        I.   Claim 1-12, 17-20 drawn to simulation of an input sequence with partitioning and randomness,

                classified in class 703, subclass 2.

        II.   Claims 21-23 drawn to simulation of an input sequence with partitioning and randomness as well

                as pixel extraction of an image and color variations. classified in class 703, subclass 2.

        III.   Claims 24-26 drawn to simulation of an input sequence with partitioning and randomness in

                multiple systems as well as utilization of error correction, classified in class 703, subclass 2

3.   i)   Inventions listed in Groups I-III above are directed to related with respect to the simulation of an

input sequence. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use

together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not

overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP

§ 806.05(j). In the instant case, the inventions as claimed require distinct mathematical methods in order to

implement the grouped claims.

        ii)   Group I requires a partitioning and randomness with respect to the sequence, Group II requires

pixel extraction of an image as well as color variations, Group III requires multiple systems as well as utilization of

error correction. The claims would require distinct searches in order to encompass the numerous distinct and

different mathematical approaches for the simulation of the input sequence. Furthermore, the inventions as claimed

do not encompass overlapping subject matter with respect to the mathematical methods employed and there is

nothing of record to show them to be obvious variants.

iii)   Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

iv)   Newly submitted claims 21-26 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: See above.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-26 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

4.   Applicant's arguments filed 26 April 2007 have been fully considered but they are not persuasive.

i)   Applicant argues that the reference does not teach "outputting substrings in a random order to generate an output sequence." As Applicants have stated the reference teaches "One way to assess the performance of a universal source code is to study how well it compresses a random output from a known probabilistic source." This section recites random output. Further as can also be seen on page 1700 left column, the source sequences or parsed phrases further have random variables assigned to them to imbue randomness. This appears to follow the methodology of the claimed invention. This is further reinforced, following Applicants argument that the reference does not teach "simulating a sequence", by the references teaching of a renewal process of sequences, see at least page 1693 left column, first full paragraph. This renewal process is performed at random intervals and further as per equation 5 the reference teaches source output sequences with randomness.

ii)   Applicant argues that the reference does not teach used or unused nodes. As per page 1698, left column, second full paragraph, the uniquely parsable nature of the dictionary tree seems to be functionally equivalent to the use concept of nodes discussed in the claims. A uniquely parsable dictionary would not require backtracking and would therefore be functionally equivalent to the concept of available and unavailable nodes. This can also be seen with respect to the Tunstall algorithm also discussed in the reference.

iii)   Applicants have argued that the reference teaches encoding or compression whereas the presented claims merely teach a simulated sequence. However as can be seen in the claims recitation of Lempel-Ziv, the claimed invention deals with lossless data compression simply by the definition of the Lempel-Ziv algorithm, LZW.

iv)   Following the Examiners response above Applicants arguments with respect to the 103 rejections are rendered moot.

v)   Examiner has cited particular columns and line numbers in the references applied to the claims for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

v)   The Examiner respectfully requests, in the event the Applicants choose to amend or add new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution.

vi)   Further, the Examiner respectfully encourages Applicants to direct the specificity of their response with regards to this office action to the broadest reasonable interpretation of the claims as presented. This will avoid issues that would delay prosecution such as limitations not explicitly presented in the claims, intended use statements that carry no patentable weight, mere allegations of patentability, and novelty that is not clearly expressed.

Claim Objections

5.   Claim 2 is objected to because of the following informalities:

i)   Claim 2 does not refer to a preceding claim. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim. A claim which depends from a

dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the

rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   **Claims 1-10, and 17-20 are rejected** under 35 U.S.C. 102(b) as being clearly anticipated by **Savari**

"Renewal Theory and Source Coding," hereafter referred to as Savari.

Regarding Claim 1:

The reference discloses A computer program product for simulating an input sequence, the product being

embodied on a computer readable medium and comprising code that when executed causes a computer to perform

the following:

partitioning the input sequence into a partition including a set of substrings and a tail, wherein the

substrings have lengths that are not all equal; **(Paragraph 17 of Applicants specification states that the**

Lempel-Ziv incremental parsing rule will result in a partition that is "sure to provide substrings of

different lengths." Lempel Ziv is discussed in Savari on Page 1695, Right Column, Paragraph 3)

and

outputting the substrings in a random order to generate an output sequence simulating the input

sequence. **(Savari. Page 1695, Right Column, Paragraph 3)**

Regarding Claim 2:

The reference discloses The product of claim 3, wherein the tail is selected from the group consisting of

an empty string and the substrings of the partition. **(Savari. Page 1696, Left Column, Paragraph 3, "empty**

string")

Regarding Claim 3:

    The reference discloses The process of claim 1, wherein partitioning the sequence comprises selecting each of the substrings to consist of one or more consecutive symbols from the input sequence, where each of the substrings differs from the other substrings of the partition. **(Savari. Page 1695, Right Column, Paragraph 3. Unequal lengths implies different)**

Regarding Claim 4:

    The reference discloses The process of claim 1, wherein for each substring, the substring is a shortest sub-sequence of consecutive symbols from the input sequence such that the substring differs from all of the substrings that are in the partition and preceding in the input sequence. **(Savari. Page 1695, Right Column, Paragraph 3. This limitation is an aspect of Lempel Ziv)**

Regarding Claim 5:

    The reference discloses The product of claim 4 wherein the code, when executed, further causes the computer to perform the following:

        drawing a random integer from a range of [Tx[integers, where ITxI is the number of sequences in a set Tx such that for each sequence in the set Tx, a partition of the sequence into substrings such that each substring is a shortest sub-sequence of symbols from the sequence that differs from all of the substrings of the partition that are preceding in the sequence includes a set of substrings that is equal to the set of the substrings in the partition of the input sequence; and **(Savari. Page 1695, Right Column, Paragraph 3. Random Output)**

        mapping the random integer to a corresponding one of the sequences in set Tx, wherein the sequence corresponding to the random integer defines the random order for outputting the substrings. **(Savari. Page 1695, Right Column, Paragraph 3. Random Output)**

Regarding Claim 6:

    The reference discloses The product of claim 1, wherein outputting the substrings comprises:

organizing the substrings in a tree having multiple levels, wherein each of the levels contains substrings of equal length, and branches between any two of the levels connect each substring in a higher of the two levels to a substring that results from deleting a last symbol of the substring; **(Savari. Page 1698, Left Column, Paragraph 1-2)**

designating the substrings in the partition as available; **(Savari. Page 1698, Left Column, Paragraph 1-2)**

selecting one of the substrings as a current substring; **(Savari. Page 1698, Left Column, Paragraph 1-2)**

randomly selecting one of the branches from the current substring to the substrings in a higher one of the levels of the tree, wherein each of the branches from the current substring has a probability of being taken that depends on how many available uses there are of the substrings that are connected through the branch to the current substring; **(Savari. Page 1695, Right Column, Paragraph 3. Random Output)**

changing the current substring to the substring at an end of the branch selected; **(Savari. Page 1698, Left Column, Paragraph 1-2)**

in response to the current substring not being available, repeating selection of one of the branches from the current substring and changing the current substring to the substring at the end of the branch selected; otherwise**(Savari. Page 1698, Left Column, Paragraph 1-2)**

outputting the current substring; and **(Savari. Page 1698, Left Column, Paragraph 1-2)**

marking the current substring as used. **(Savari. Page 1698, Left Column, Paragraph 1-2) (Claim Interpretation. The steps indicated above appear to be a process of tree parsing and parsability as discussed in the reference on Page 1698, Left Column, Paragraph 1-2)**

Regarding Claim 7:

The reference discloses The product of claim 6, wherein selecting one of the substrings as the current substring comprises selecting an empty string as the current substring. **(Savari. Page 1698, Left Column, Paragraph 1-2. Null root)**

Regarding Claim 8:

The reference discloses The product of claim 6, wherein marking the current substring as used changes the string from being available to being unavailable. (**Savari. Page 1698, Left Column, Paragraph 1-2. Path parsability/probability**)

Regarding Claim 9:

The reference discloses The product of claim 6, wherein marking the current substring as used reduces available uses of the current substring. (**Savari. Page 1698, Left Column, Paragraph 1-2. Path parsability/probability**)

Regarding Claim 10:

The reference discloses The product of claim 6, wherein the probability of each of the branches being taken is equal to a ratio of a total of the available uses of the substrings that are connected through the branch to the current substring and a total of available uses of the substrings that are connected through all of the branches connecting the current substring to higher levels in the tree. (**Savari. Page 1698, Left Column, Paragraph 1-2. Path parsability/probability**)

Regarding Claim 17:

The reference discloses A computer program product for generating a simulated sequence, the product being embodied on a computer readable medium and comprising code that, when executed causes a computer to perform the following:

a) creating a tree structure having nodes that correspond to substrings resulting from parsing an input sequence, wherein all of the nodes except a root node are initially designated as being unused; (**Savari. Page 1698, Left Column, Paragraph 1-2**)

b) setting a current node equal to the root node; (**Savari. Page 1698, Left Column, Paragraph 1-2**)

c) in response to the current node being unused, outputting a substring corresponding to the current node as part of the simulated sequence, designating the current node as being used, and setting the current node equal to the root node; and **(Savari. Page 1698, Left Column, Paragraph 1-2)**

d) in response to current node being used, selecting a branch from the current node to one of the nodes in a higher level of the tree structure and setting the current node to the node at an upper end of the selected branch. **(Savari. Page 1698, Left Column, Paragraph 1-2)**

e) repeating (c) and (d) until all of the nodes are used. **(Savari. Page 1698, Left Column, Paragraph 1-2)**

(Claim Interpretation. The steps indicated above appear to be a process of tree parsing and parsability as discussed in the reference on Page 1698, Left Column, Paragraph 1-2)

Regarding Claim 18:

The reference discloses The product of claim 17, wherein the substrings resulting from parsing the input sequence comprises the substrings from parsing the input sequence according to the Lempel-Ziv incremental parsing rule. **(Savari. Page 1695, Right Column, Paragraph 3)**

Regarding Claim 19:

The reference discloses The product of claim 17, wherein the input sequence comprises a binary sequence, and selecting the branch from the current node comprises:

selecting a first branch from the current node if a second branch from the current node is blocked;

(Savari. Page 1698, Left Column, Paragraph 1-2. Parsability) and

selecting the second branch from the current node if the first branch from the current node is blocked. **(Savari. Page 1698, Left Column, Paragraph 1-2. Parsability)**

Regarding Claim 20:

The reference discloses The product of claim 17, wherein the input sequence comprises a binary sequence, and selecting the branch from the current node comprises selecting a branch Vb, wherein branch index b is a

randomly drawn bit with a probability of being 1 equal to $U(V1)/[U(V0)+U(V1)]$, $U(V1)$ is a number of unused

nodes on a branch V1 from the current node, and $U(V0)$ is a number of unused nodes on a branch V0 from the

current node. (Savari. Page 1698, Left Column, Paragraph 1-2. Path parsability/probability)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set

forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are

applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as

follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35
U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time
any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the
obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly
owned at the time a later invention was made in order for the examiner to consider the applicability of 35
U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7.   Claim(s) 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Savari in view of Sakarya et**

al. "An Evaluation of SAR Image Compression Techniques," hereafter referred to as Sakarya.

Regarding Claim 11:

Savari does not explicitly disclose The product of claim 1 wherein the code when executed further causes

the computer to perform the following:

generating the input sequence from an ordering of pixel values in a digital representation of a

texture; and

generating a digital representation of a simulation of the texture from the output sequence.

However, Sakarya discloses The process of claim 1, further comprising:

generating the input sequence from an ordering of pixel values in a digital representation of a

texture; (Sakarya. Page 2833, Introduction, Paragraph 2 as well as Section 2, Paragraph 1-2) and

generating a digital representation of a simulation of the texture from the output sequence.

(Sakarya. Page 2833, Introduction, Paragraph 2 as well as Section 2, Paragraph 1-2)

Savari and Sakarya are analogous art in that they both deal with lossless data compression algorithms.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the

process of claim 1, defined as the well known Lempel-Ziv compression algorithm in Savari, for the texture

representation in Sakarya in order to offer a practical solution for the prevention of deterioration of system

performance (Sakarya. Page 2833, Introduction, Paragraph 1)

8.   Claim(s) 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Savari in view of El-Maleh et

al. "A Geometric Primitives Based Compression Scheme for Testing Systems on a Chip" hereafter referred to

as El-Maleh.

Regarding Claim 12:

Savari does not explicitly disclose The product of claim 1 wherein the code when executed further causes

the computer to perform the following:

generating the input sequence from measurements of a first system; and

using the output sequence for testing of a second system.

However, El-Maleh discloses The process of claim 1, further comprising:

generating the input sequence from measurements of a first system; (El-Maleh. Page 55, Left

Column, Paragraph 1 and Last Paragraph) and

using the output sequence for testing of a second system. (**Claim Interpretation. This limitation is drawn to an intended use and is therefore not afforded patentable weight. However, in the interests of compact prosecution the claim will be interpreted as though Applicants have resolved the intended use.) (El-Maleh. Page 55, Left Column, Paragraph 1 and Last Paragraph)**

Savari and El-Maleh are analogous art in that they both deal with lossless data compression algorithms.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the process of claim 1, defined as the well known Lempel-Ziv compression algorithm in **Savari**, for the system on chip testing in **El-Maleh** in order to decrease testing time by decreasing test data. (**El-Maleh. Page 54, Introduction, Paragraph 2)**

Conclusion

9.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10.   Claims 1-12, and 17-20 are rejected. Claims 21-26 are restricted.

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah

can be reached on (571) 272-22792279. The fax phone number for the organization where this application or

proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information

Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR

or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more

information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the

Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

July 21, 2007

KAMINI SHAH
SUPERVISORY PATENT EXAMINER